

Sugar House Earthquake Mitigation Return-On-Investment

For Single Family Residences in the Sugar House Community of Salt Lake City, Utah



HAZUS-MH is a loss estimation methodology developed by the Federal Emergency Management Agency (FEMA) and provides a rigorous scientific model to calculate losses due to natural hazards. The Advanced Engineering Building Module (AEBM) was used to perform a Level 3 analysis of the Sugar House parcels and accounts for a building's structural components and reaction to strong ground motion.

Sugar House is an historic district at the southeast corner of Salt Lake City on top of a fault line with most single-unit residences as are either unreinforced masonry or wood frame. The loss estimation results are based on a probabilistic magnitude 7.0 event with a recurrence interval of 1,500 years. Hazard contour maps from the Utah Geological Survey provided data about soil type, water depth, liquefaction and landslide susceptibility, peak ground acceleration, peak ground velocity, and spectral acceleration at both 0.3 and 1.0 seconds.

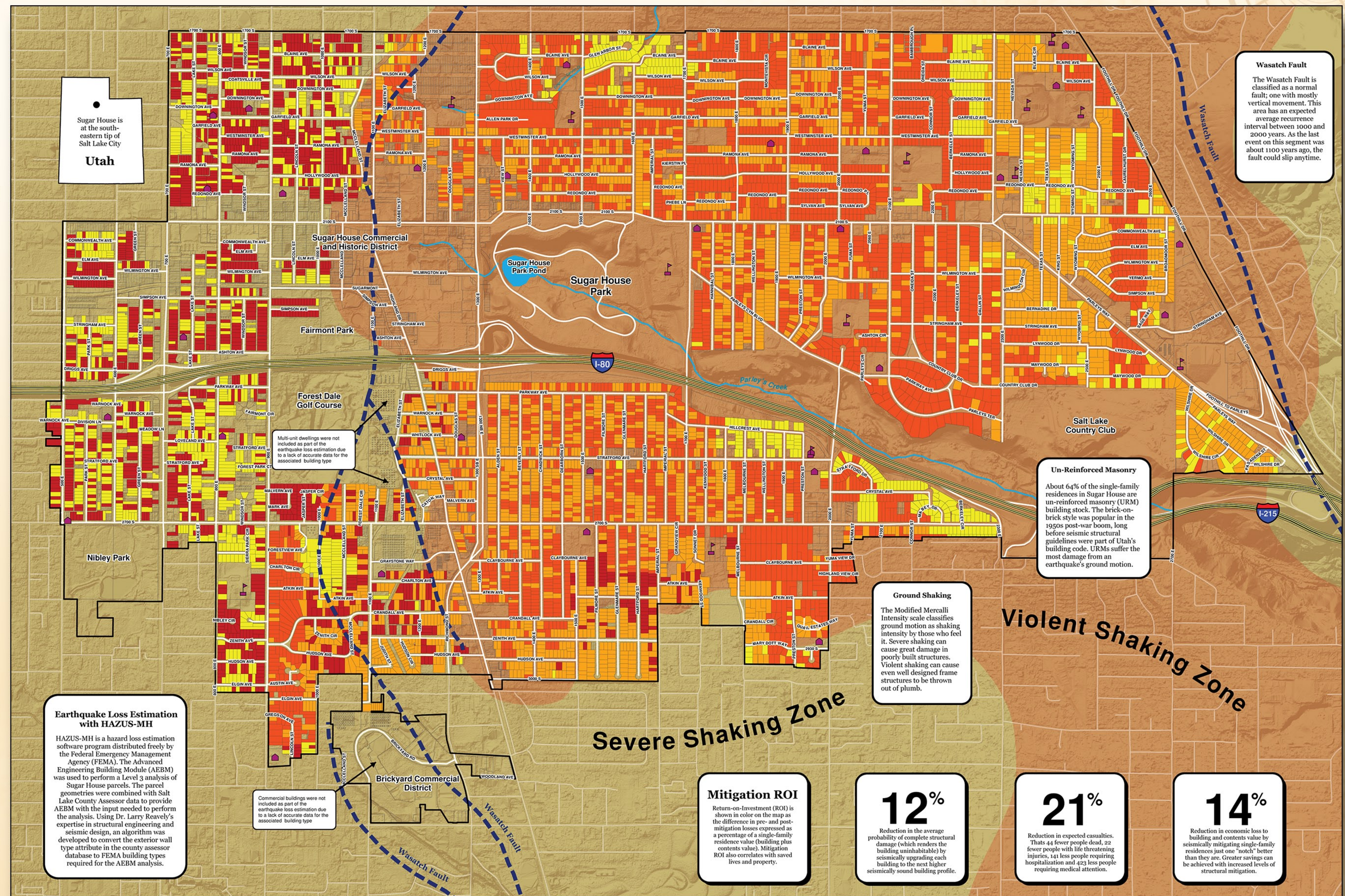
AEBM output gave estimates for casualties, building damage and economic losses (both structural and non-structural). These data points were combined with the parcel geometry in ArcGIS. The map shows the return-on-investment (ROI) as the difference in pre- and post-mitigation losses expressed as a percentage of single-family residence value (building plus contents value).

This information helps legislators discover how research at the university can benefit the community and state, and the public understand the magnitude of losses expected in a major earthquake along the Wasatch fault and implement legislation to promote earthquake mitigation.

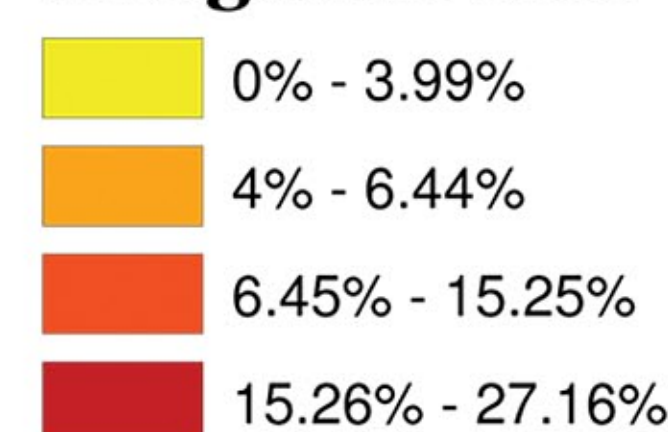
HAZUS-MH information:
www.fema.gov/plan/prevent/hausus
 Utah Geological Survey: geology.utah.gov



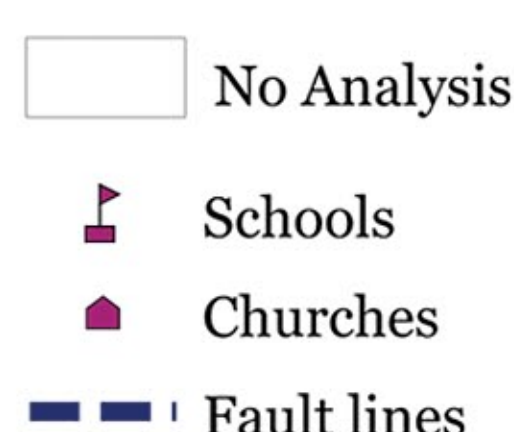
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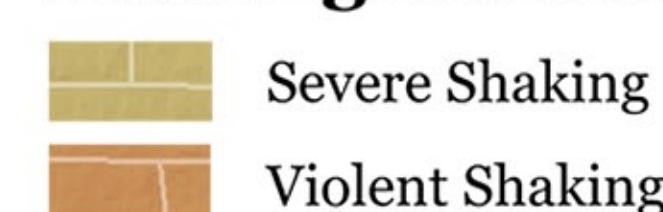
Mitigation ROI



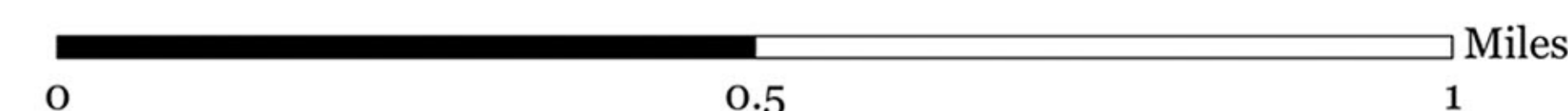
* Analysis does not include results for non-single-family units (e.g. commercial, apartments).



Shaking Intensity



Shaking intensity is based on Modified Mercalli Intensity. Severe shaking is MMI VIII; Violent shaking is MMI IX.



Sugar House encompasses roughly six square miles. The area dates back to the late 1800s when pioneers built an experimental sugar beet mill. The industrial age saw the development of Furniture Row along 2100 S at 1100 E. Today's redevelopment includes mixed-use housing, shops, restaurants, and the historic Sprague Library.

DATA SOURCES: HAZUS-MH (Loss Estimation Methodology developed by FEMA); Utah Automated Geographic Reference Center (AGRC)— parcels, streets, LIDAR, fault lines, interstates, churches, schools; Salt Lake City, UT— Sugarhouse Community boundaries, waterways; Utah Geological Survey— earth science hazards

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